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ABSTRACT

This manual provides guidelines for school facilities for conducting technology education throughout the curriculum, especially in Florida. The introductory section of the manual defines technology education and provides information on how it is conducted at each educational level. It also provides technology education facilities guidelines for facility design and for using advisory groups. The following five sections provide procedures for developing a technology laboratory: (1) the program facilities list; (2) educational specifications design documents; (3) architectural plans; (4) contractor bids and construction; and (5) occupancy and post-occupancy evaluations. A glossary provides definitions of 47 terms. (KC)

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TECHNOLOGY EDUCATION FOR YEAR 2000

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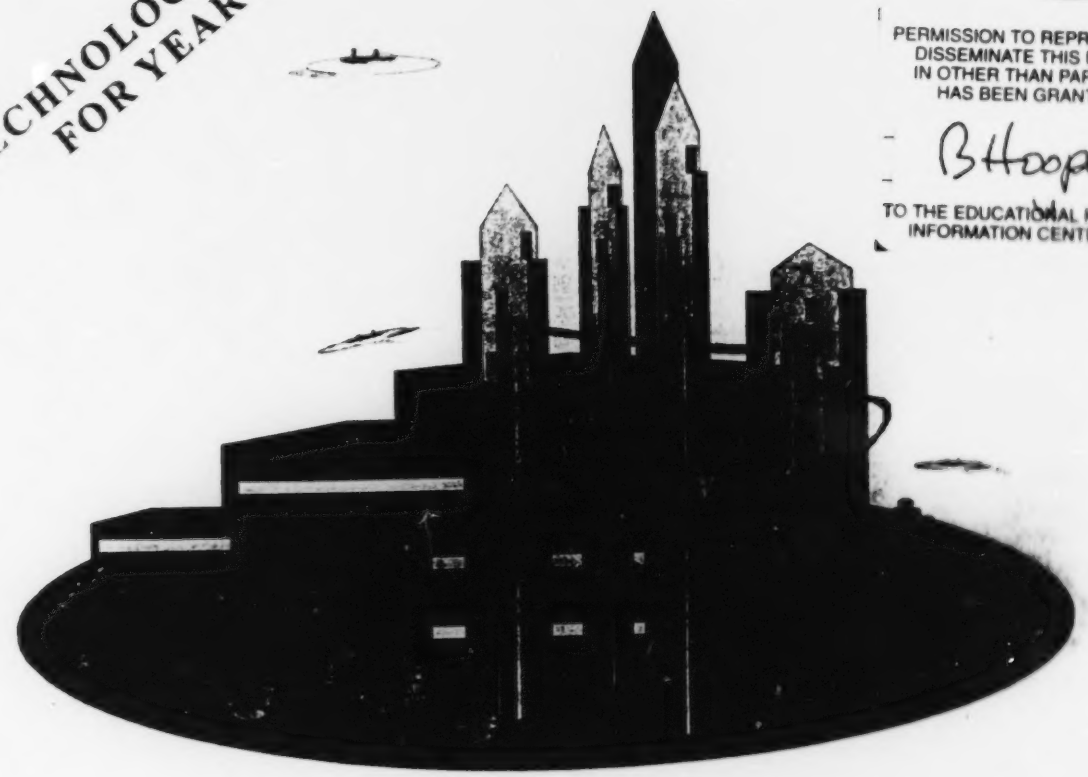

A Design Handbook For Technology Education Facilities And Other Related Programs

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TECHNOLOGY EDUCATION FOR YEAR 2000

Technology Education is a comprehensive, action-based K-12 discipline designed to incorporate information technologies, physical technologies, and biotechnologies in promoting the integration of academic and career skills with an emphasis on problem solving and decision making that is essential in developing the human potential needed to compete in a technological society.

A Design Handbook For Technology Education Facilities And Other Related Programs

JANUARY 1997

Florida Department of Education
Division of Applied Technology, Adult & Community Education
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TECHNOLOGY EDUCATION FACILITIES GUIDELINES

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TECHNOLOGY EDUCATION

EDUCATION'S ROLE IN PREPARING A TECHNOLOGICALLY LITERATE CITIZENRY

Within the four walls of a school we cannot prepare every student for a specialized occupation. However, we can and must help every student learn about the technology revolution that will dramatically shape their lives. By the time they finish high school, young adults should be fully aware that they will encounter technology on an ever changing basis throughout their lives. It is not enough that they accumulate knowledge along the way; they should also know what technology means, what it is, and how it can be applied. Ultimately, each student should participate at some level as a technologist, thriving in a highly technical world.

Although Technology Education is taught in programs designated as "Technology Education," it may also be taught more indirectly in other programs. A program of Technology Education is useful, however, as an organizing theme or integrator binding together applications of all technological studies.

Technology Education should not be confused with Educational Technology. Technology Education is a subject area centered on Technology and related aspects as its content base. Educational Technology deals with instructional technology devices to enhance teaching methodology.

Technology education should describe technology in a holistic way, showing it as part and parcel of our history, our everyday existence, and our future. It should provide opportunities to experience technology as well as learn it in the abstract. It should connect the technic with the ethics.

Because the American culture is distinctly characterized as technological, it is the function of schools to give every student an insight into and understanding of the technological nature of the culture. This is what the program of Technology Education strives to do. It acquaints all persons with their technological environment so they can make rational decisions about their own lives on a day-to-day basis and eagerly participate in controlling their own destiny. Overall, Technology Education is a liberating force which does not arbitrarily divide students - saying to some, "you're the workers" and to others, "you're the thinkers." Life for all of us is a blend of both.

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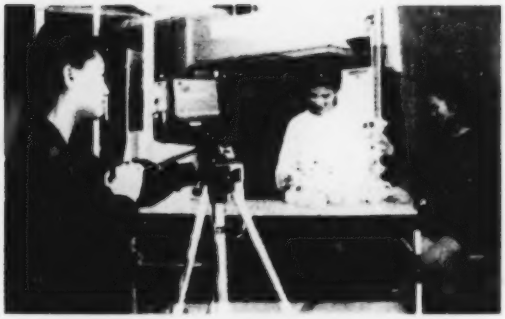
A DEFINITION OF TECHNOLOGY



Simply stated, technology can be defined as "man's handiwork" or "the way things work." It is the application of knowledge, tools, and skills to solve practical problems and extend human capabilities. Technology is best described as process, but it is more commonly known by its products and their effects on society. It is enhanced by the discoveries of science and shaped by the designs of engineering. It is conceived by inventors and planners, raised to fruition by the work of entrepreneurs and craftsmen, and implemented and used by society. Sometimes, though, it enters the social system imperceptibly and brings about many changes, often in unforeseen ways.

Technology is in part a social process. Technology is supported to serve the society that generates and controls it through society's private and public institutions; people need to understand the interactions of technology and its various fields with human social systems and the values that society may apply. The results and dynamics of these interactions are key to the ways in which technology affects people's lives.

Technology is also a technical process. It should not be confused with science. Science is what the universe, macrocosm and microcosm, consists of galaxies, planets, stars, cells, atoms, and particles. Technology is tools, machines, power, instrumentation, processes, and techniques. Science is investigation, discovery, and the formulation of theories and laws. Technology's role is doing, making, and implementing things. The principles of science, whether discovered or not, underlie technology. The results and actions of technology are subject to the laws of nature, even though technology has often preceded the discovery of the science on which it is based.

TECHNOLOGICAL LITERACY

Specialized occupational training in vocational job preparatory programs may make a person more technologically literate but it goes beyond general technological literacy. Technological literacy in our modern times is required of all citizens and is not just the province of specially trained or technologically elite groups. Otherwise, there is the risk that the flow of technological information will be stopped or that the populace will bind itself in a position of reacting to decisions without their participation or consent. Literacy by its very nature implies that a person must be able to do something. To be technologically literate, a student must have the opportunity to develop rudimentary skills regarding tools, materials, and processes as well as to understand and appreciate how technology affects our lives and careers. Technological literacy, then, means that a student must understand basic technological concepts; know societal needs and moral constraints; be cognizant of the application of scientific and mathematical principles to tools and materials; and, to a certain extent, be able to utilize these tools and materials.

TECHNOLOGY EDUCATION

Today, curricula design in Technology Education is responding to the realities of a new age. The concept is sound and achievable and we are currently moving toward full realization as we undertake a mode of responding to change.

Technology Education is defined as: A comprehensive, action-based educational program concerned with technical means, their evolution, utilization, and significance; with industry, its organization, personnel systems, techniques, resources, and products; and their social/cultural impact. Florida's program of Technology Education is organized around, but not limited to, the technological categories of communications, construction, manufacturing, production, energy, power, transportation, engineering, drafting, electronics, and other supporting content areas. Applied learning activities are conducted in a laboratory setting with a minimum of 75 percent hands-on experiences with technological tools, machines, instruments, materials, processes, and systems. Several courses are available for offering Technology Education beginning at the elementary school level and continuing through grade 12 at the high school level. A total program can be designed from these courses in an articulated sequence so that students gain maximum educational benefits from taking Technology Education. Detailed curriculum frameworks for the courses are listed and updated in the Vocational Education Program Courses Standards for Technology Education. The following chart outlines the Technology Education Program/Course Titles for grades K-12.

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TECHNOLOGY EDUCATION PROGRAM AND COURSE CHANGES

Program/Course Number	Program/Course Title	Grade Levels	Graduation Requirements	Credit	Certification
8600000	**Integrated Technology Studies**	6-9			I ART-TEC 1 2
8600010	Introduction to Technology		VO	0.5	INDUS ARTS @4 @6
8600020	Exploring Technology		VO	0.5	
8600030	Exploration of Communications Technology		VO	0.5	
8600040	Exploration of Production Technology		VO	0.5	
8600050	Exploration of Aerospace Technology		VO	0.5	
8600400	**Technology Systems**	9-12,30,31			I ART-TEC 1 2
8600410	Communications Systems		VO	0.5	INDUS ARTS @4 @6
8600420	Power and Transportation Systems		VO	0.5	
8600430	Production Systems		VO	0.5	
8600440	Illustrative Design Systems		VO	0.5	
8600450	Electronics Systems		VO	0.5	
8600460	Engineering Systems		VO	0.5	
8600470	Applied Technology Systems		VO	0.5	
8600480	Home Technology Systems		VO	0.5	
8600500	**Technology Applications I**	9-12,30,31			I ART-TEC 1 2
8600510	Technology Studies I		VO	1.0	INDUS ARTS @4 @6
8600520	Communications Technology I		VO	1.0	
8600530	Power and Transportation Technology I		VO	1.0	
8600540	Production Technology I		VO	1.0	
8600550	Illustrative Design Technology I		VO	1.0	
8600560	Electronics Technology I		VO	1.0	
8600570	Engineering Technology I		VO	1.0	
8600580	Aerospace Technology I		VO	1.0	
8600600	**Technology Applications II**	9-12,30,31			I ART-TEC 1 2
8600610	Technology Studies II		VO	1.0	INDUS ARTS @4 @6
8600620	Communications Technology II		VO	1.0	
8600630	Power and Transportation Technology II		VO	1.0	
8600640	Production Technology II		VO	1.0	
8600650	Illustrative Design Technology II		VO	1.0	
8600660	Electronics Technology II		VO	1.0	
8600670	Engineering Technology II		VO	1.0	
8600680	Aerospace Technology II		VO	1.0	
8601700	**Technology Applications III**	9-12,30,31			I ART-TEC 1 2
8601710	Technology Studies III		VO	1.0	INDUS ARTS @4 @6
8601720	Communications Technology III		VO	1.0	
8601730	Power and Transportation Technology III		VO	1.0	
8601740	Production Technology III		VO	1.0	
8601750	Illustrative Design Technology III		VO	1.0	
8601760	Electronics Technology III		VO	1.0	
8601770	Engineering Technology III		VO	1.0	
8601780	Aerospace Technology IIII		VO	1.0	

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ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

Elementary School Technology Education experiences are designed to assist in the attainment of educational goals within a total elementary school program. These important learning experiences should orient students to Technology Education, provide assistance in the development of personal psychomotor skills, and re-define attitudes relating to the effect of Technology on society. The Technology Education program activities should be integrated into the total elementary school curriculum, and these activities should provide students with experiences that reinforce this curriculum.

MIDDLE/JUNIOR HIGH SCHOOL TECHNOLOGY EDUCATION

Technology Education programs at the middle or junior high school level are exploratory in nature. At this level, students investigate and examine broad content areas of Technology Education. It is recommended that all students take Technology Education at this level, whether they have future plans to enter college or to pursue a vocation after high school, and regardless of their career goals. Technology Education courses at the middle school or junior high school level should be designed to lead into a well-articulated series of courses at senior high school and postsecondary levels. As a result of taking Technology Education at the middle school or junior high school level, all students can begin to develop their innate talents, attitudes and skills to better live in our technological world. Problem solving, career orientation, and learning for tomorrow's adaptive environment are cornerstones of the Technology Eduction program at the middle school and junior high school level.

HIGH SCHOOL TECHNOLOGY EDUCATION

The Technology Education programs at the high school level are designed to provide an in-depth foundation for career preparation at the secondary or postsecondary levels. Students will gain an adaptability leading to consumer awareness and personal enrichment, as well as occupational readiness. Students pursuing engineering and scientific careers in colleges or universities will gain much from taking certain Technology Education courses. Also, students will develop transferable skills for life as well as for further education. The program complements the middle or junior high school curriculum and offers sequential courses that build on previously learned content without repetition.

Technology Education is a link in the educational process that treats academic and vocational skills in both theoretical and applied ways. It reduces barriers between academic programs and vocational training. Students are provided optimum experiences, both abstract and concrete, through the application of technological tools, materials, systems and processes. It is a type of learning that allows students to make sense out of their world and provides the correct balance of depth and breadth to enable them to deal with a world of rapid change and complexity.

Although specfic technologies may become obsolete in the future, the student, through Technology Education, will gain learning experiences that will provide a sense of worth and self-confidence that will enable him or her to compete in a changing world .

FACILITIES GUIDELINES

Planning

Involvement

Design

Funding

Process

Construction

Evaluation

FACILITY DESIGN CRITERIA

PHASE I - INITIAL PLANNING

In the process of facility planning, educators translate their professional judgement and the most modern educational philosophy into a three dimensional space. To insure a properly designed facility, many points of view representing many areas of expertise are assembled as advisory groups consist of educational administrators, teachers, students, and other professionals. The purpose of this advisory group could be to plan a Technology Education laboratory or a complete school facility. Once assembled, this advisory group will be responsible for all phases of planning and construction from the reviewing of a Facility List to actual occupancy of the structure. Although the process may vary, the basic sequence is consistent for every project.

The Initial Phase of planning involves the **Facilities List**, and the **Educational Plant Survey**. These documents are prepared by the local school district, and are approved by the Superintendent and School Board. Once a Survey recommendation is selected, it becomes the focus for developing Educational Specifications. Educational Specifications result from many discussions and decisions on district philosophy, content of programs, staffing, students, and house and space requirements. Survey recommendations and method of construction are both important factors when selecting an appropriate source of funding.

PHASE II - DESIGN

The Design Phase involves architectural planning which culminates in the development of **Schematics**, **Plan Design**, and **Final Documents**. Sources of funding for each project are critical because the bidding and awarding of contracts is contingent upon adequate financing. After contract approval by the School Board, an inventory update on the Florida Inventory of School Houses (**"FISH"**) should be submitted to the Florida Department of Education in Tallahassee.

The Public Education Capital Outlay (**"PECO"**) maintenance source of funding is based on the most recent **net square footage** of space in the **"FISH"** inventory.

PHASE III - CONSTRUCTION

In the Construction Phase, amendments are often added to the original agreement. These amendments could result in an additional project cost. Architects and advisory group members must closely monitor this portion of the process and provide approval of construction changes prior to funding payout. After the installation of equipment and furnishings and the completion of the occupancy inspection report, students and staff are then allowed to enter the facility.

With School Board approval, a Post-Occupancy evaluation may be completed after one year of actual facility use. The purpose of this Post-Occupancy report is to provide valuable information on what works and doesn't work as well as document user information for future construction planning.

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HUMAN RESOURCE STRATEGY

AN ADVISORY GROUP FOR FACILITIES PLANNING

The Advisory Group includes individuals with diversity in educational endeavor and possession of academic, as well as business, acumen. These individuals are responsible, prudent citizens who can play a key role in the decision making process necessary for guiding the planning and design phases of facilities construction. Although a typical Advisory Group may vary in size and composition, a common bond of interest must exist in order to achieve optimum results and gain strong community support for facilities planning.

A typical facilities Advisory Group should include:

- School superintendent or designee
- Local school facilities planner
- District-wide administrative staff
- School based principals/coordinator
- Specific and regular teaching staff
- Student body representatives
- School support services staff
- Community/parents, interested citizens
- Joint use/government agencies
- Business/industry/corporate executives
- The project architect/designer

The District Administrative Staff have responsibility for developing educational programs, planning construction, budgeting and facilities standards. The School Board is the legal authority and has approval power over the total district operation from policy making to finance. The Facilities Planner is usually responsible for coordinating the process of planning new construction or remodeling and renovation of existing facilities.

Future users of the facility are the principal, teachers, support staff and students. Their participation in the advisory group insures that practical concerns and curriculum needs are properly incorporated into the development phase. It is especially important that Technology Education teachers become involved in the project from the beginning to provide for their infusion of knowledge and expertise. The Department of Education facilities specialist and curriculum specialist may also participate in an advisory role and provide resource information regarding annual statutory changes and other important new statewide recommendations.

The architect can provide valuable technical assistance either during or after completion of the Educational Specifications. However, the use of Educational Specifications is critical when architects join projects at the plan design phase.

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For large or complex facilities projects, additional advisory group members may be selected from business, industry and the community. On these large projects, the Advisory Group may be subdivided into small committees for different types of work or individual programs. An example would be Technology Education, Science and Mathematics; another example is for new construction to be treated separately from remodeling and renovation. In every instance, composition of these Advisory Group committees should consist of members who share philosophical beliefs.

These small committees should be knowledgeable about their project or program area in order to give direction to the larger Advisory Group. Even though these small committees may have completed the initial project assignment, their responsibility continues throughout the entire process of facilities planning, construction and post-occupancy evaluation.

An important aspect of facilities planning by each small committee is the monitoring of both design and construction phases to insure a proper integration of Technology Education with other programs. This committee should define in detail important facility design requirements to insure that all construction needs are met, and with members of the other committees, review each phase of construction at major milestones, and become involved in preparation of the final detailed list for both furniture and equipment.

The Advisory Group and smaller committees should participate in the preparation and interpretation of Educational Specifications for the architect; provide other important resource information for the architect during planning and design; monitor construction; and review each phase of the project to insure adequacy of design. This group should be cognizant of the importance of a post-occupancy evaluation, and inform other members of the community about the importance of their facilities Advisory Group experience, while building support for taxes to fund future capital outlay bond referenda.

PROCEDURES FOR DEVELOPING A TECHNOLOGY EDUCATION LABORATORY

Survey & Program Facilities List

1.

Educational Specifications

2.

Architectural Plans

3.

4.

Contractor Bids & Construction

Post-Occupancy Evaluation

5.

SECTION 1

THE PROGRAM FACILITIES LIST AND SURVEY

THE PROGRAM FACILITIES LIST

According to recommended standards in "SREF," State Requirements for Educational Facilities (1994), a district generated school board approved list of educational programs, related spaces, and occupancy design criteria shall provide the necessary information for the development of Educational Specifications which also provides a framework for completing the Architectural Plans.

This document, referred to as the "Facilities List," reflects planning by district staff members and community participants, and after School Board approval, becomes the tool for future facilities planning activities.

It is important that this Facilities List have approval of both the local School Board and the Division of Applied Technology and Adult Education. This document should reflect the educational philosophy of the local School District and the State Commissioner of Education.

Once completed, the Facilities List becomes a basis for all construction outcomes, and becomes the design document for all future activities leading to facility construction and occupancy by staff and students.

THE EDUCATIONAL PLANT SURVEY

This document is a systematic study of existing educational and ancillary plants and an estimate of their future needs in terms of renovation, remodeling and/or additions. The survey is not primarily interested in educational programs. However, there is need to show a relationship between educational facilities and programs in order to provide judgmental decisions in terms of recommendations in the Educational Plant Survey.

THE PURPOSE OF AN EDUCATIONAL PLANT SURVEY

The purpose of an Educational Plant Survey is to encourage a thoughtful, organized process in order to provide for both educational and ancillary facilities to adequately house students, teaching staff, support staff, and administrators, as well as the activities of a local School District. This document shall aid the local School Board in formulating plans and planning capital outlay budgets for the next several years.

An Educational Plant Survey is conducted every five years, but circumstances may cause a Survey to be conducted within this five year period. It may be necessary to have a Survey up-date before a local capital outlay bond referendum or because of changes in educational philosophy (i.e., changing a facilities list to add or delete programs or a grade configuration from K-5, 6-8 to Pre-K-6, 7-9 etc.); or to make changes in the current Survey anytime within the five year cycle. These changes are called a Supplemental Survey which may involve only one school or several schools within the school district.

THE LIMITATIONS OF AN EDUCATIONAL PLANT SURVEY

The Educational Plant Survey is limited to an evaluation of the effective and adequate use of facilities, not of the educational program or of the staff. All recommendations reflect changes to existing facilities or the addition of new facilities to house students and programs.

According to Florida Statutes, all Applied Technology and Adult Education programs shall be approved through a program/facilities needs survey prior to the School Board adoption of the program Facilities List.

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A TYPICAL DISTRICT FACILITIES LIST
SECTION FOR MATH, SCIENCE AND TECHNOLOGY EDUCATION

District Caldwell Total stations 1,600 Gross Sq. Ft.: 244,045
Level: High 9-12 Student Capacity 1,520 Utilization: 95%

FISH CODE	DESCRIPTION	NET SQUARE FEET	NET SQUARE FEET PER STUDENT	STUDENT STATIONS UTILIZED
	MATH			
035	Math. Classroom	756	4,536	28
808	Storage, Material			
	Subtotal	756	4,536	
	SCIENCE			
042	Science Demo Classroom	1,036	3,108	28
809	Storage, Material	155	465	
	Subtotal	1,191	3,573	
043	Science Lab	1,224	7,344	24
809	Storage, Material	155	930	
812	Storage, Project	150	900	
	Subtotal	1,529	9,174	
	TECHNOLOGY EDUCATION			
241	Electronics Technology	1,560		24
808	Storage, Material	90		
850	Storage, Tool	195		
852	Technology Resource Center	800		
	Subtotal	2,645		
242	Drafting & Design Technology	2,280		24
810	Storage, Material	395		
852	Technology Resource Center	800		
	Subtotal	3,475		
243	Communications Technology	3,240		24
808	Storage, Material	90		
810	Storage, Material	395		
852	Technology Resource Center	800		
849	Storage, Project	310		
851	Storage, Tool	310		
	Subtotal	4,525		
243	Technology Applications	3,240		24
808	Storage, Material	90		
810	Storage, Material	395		
852	Technology Resource Center	800		
849	Storage, Project	310		
851	Storage, Tool	310		
	Subtotal	4,525		

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TECHNOLOGY EDUCATION AND SCIENCE PROGRAM WORKSHEET AND MODULAR PROGRAM ACTIVITIES

SUGGESTED TECHNOLOGY EDUCATION/SCIENCE LABORATORY SPACES					
FISH CODE	**SPACES**	**ITEM**	**Per Item**	**NET SQUARE FEET**	**STUDENT STATIONS**
027	Science Lab	1		1224	24
240	Technology Lab. - Small	1		1560	24
241	Technology Lab. - Small	1		1560	24
242	Technology Lab. - Medium	1		2280	24
243	Technology Lab - Large	1		3240	24
803	Darkroom - Small	1		100	0
807	Equipment Storage- Regular	1		315	0
808	Material Storage - Small	2	90	180	0
809	Storage Material - Medium	1		155	0
810	Storage Material - Large	1		395	0
811	Storage - Outside	1		50	0
812	Storage Material - Small	1		90	0
813	Student Storage	1		40	0
814	Student Restroom- M/F	2	35	70	0
849	Project Storage - Large	1		310	0
850	Tool Storage - Small	1		195	0
851	Tool Storage - Large	1		310	0
852	Resource Center	1		800	0
854	Darkroom - Large	1		225	0

OTHER TECHNOLOGY EDUCATION PROGRAM LABORATORIES						
PROGRAM & SPACES	**PER**	**ITEMS**	**NSF**	**NSF**	**NSF**	**STU.**
Aerospace Island						
Applied Physics						
Architectural Structures						
Astronomy						
Automotive Engineering						
Biology/Ecology						
Biotechnology						
Communications						
Computer Animation						
Computer Programming						
Desktop Publishing						
Digital Electronics						
Digital Graphics						
Drafting Technology						
Electricity/Electronics						
Energy/Power Mechanics						
Environment Island						
Experimentation Island						
Fabrication Island						
Flight/Aerodynamics						
Forecasting Island						
Graphics & Animation						
Hydraulics/Pneumatics						
Industrial Pneumatics						
Laser/Fiber Optics						
Manufacturing Design						
Manufacturing Physics						
Matter/Chemical Interaction						
Materials Processing						
Meteorology/Astronomy						
Modeling Island						
Modeling/Inventing						
Nuclear Physics						
Plastics & Composites						
Pneumatics Island						
Product Design Island						
Recycle Island						
Research & Design						
Robotics Island						
Satellite Communications						
Simulation Design						
Structural Design						
Technological Systems						
Telecommunications						
Testing & Analysis						
Transportation Island						
TV Directing/Editing						

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STATE REQUIREMENTS FOR EDUCATIONAL FACILITIES
TECHNOLOGY EDUCATION LABORATORY
PROGRAM FACILITY SPACES

GRADE LEVEL	PROGRAM FACILITY SPACE	FISH DESIGN CODE	OCCUPANT DESIGN STATIONS	NET SQUARE FEET			RELATED SPACE IN NET SQ FT	PROGRAM SPACE
				MIN	NORM	MAX		
6-9	Orientation and Exploration	240	24	85	95	105	808, 810, 849, 851, 852, *854	Laboratory
	Recommended Technology Education Courses/Programs							
	Integrated Technology Studies 8600000 Introduction to Technology 8600010 Exploring Technology 8600020 Exploration of Communications Technology 8600030 Exploration of Production Technology 8600040 Exploration of Aerospace Technology 8600050 Orientation to Technology 8600110 Exploration of Power and Transportation Technology 8600240 *Exploration of Graphic Communications Technology 8600220							
GRADE LEVEL	PROGRAM FACILITY SPACE	FISH DESIGN CODE	OCCUPANT DESIGN STATIONS	NET SQUARE FEET			RELATED SPACE IN NET SQ FT	
				MIN	NORM	MAX		
9-12	Large Technology Education	243	24	120	135	150	803, 807, 808, 810, 811, 849, 851, 852, *854	Laboratory
9-12	Medium Technology Education	242	24	85	95	105	852, 803, 807, 810, *854	Laboratory
9-12	Small Technology Education	241	24	60	65	70	852, 807, 808, 850	Laboratory
	Recommended Technology Education Courses/Programs							
	Construction Technology 8600700 *Communications Technology 8601000 Aerospace Technology 8601600 Power and Transportation Technology 8601200 Materials and Processes Technology 8601100 Engineering Technology 8601300 Production Technology 8601400 Technology Applications I 8600500 Technology Applications II 8600600 Technology Applications III 8601700 *Technology Studies 8601500 Graphics/Illustrative Design Technology 8600800 Electronics Technology 8600900							

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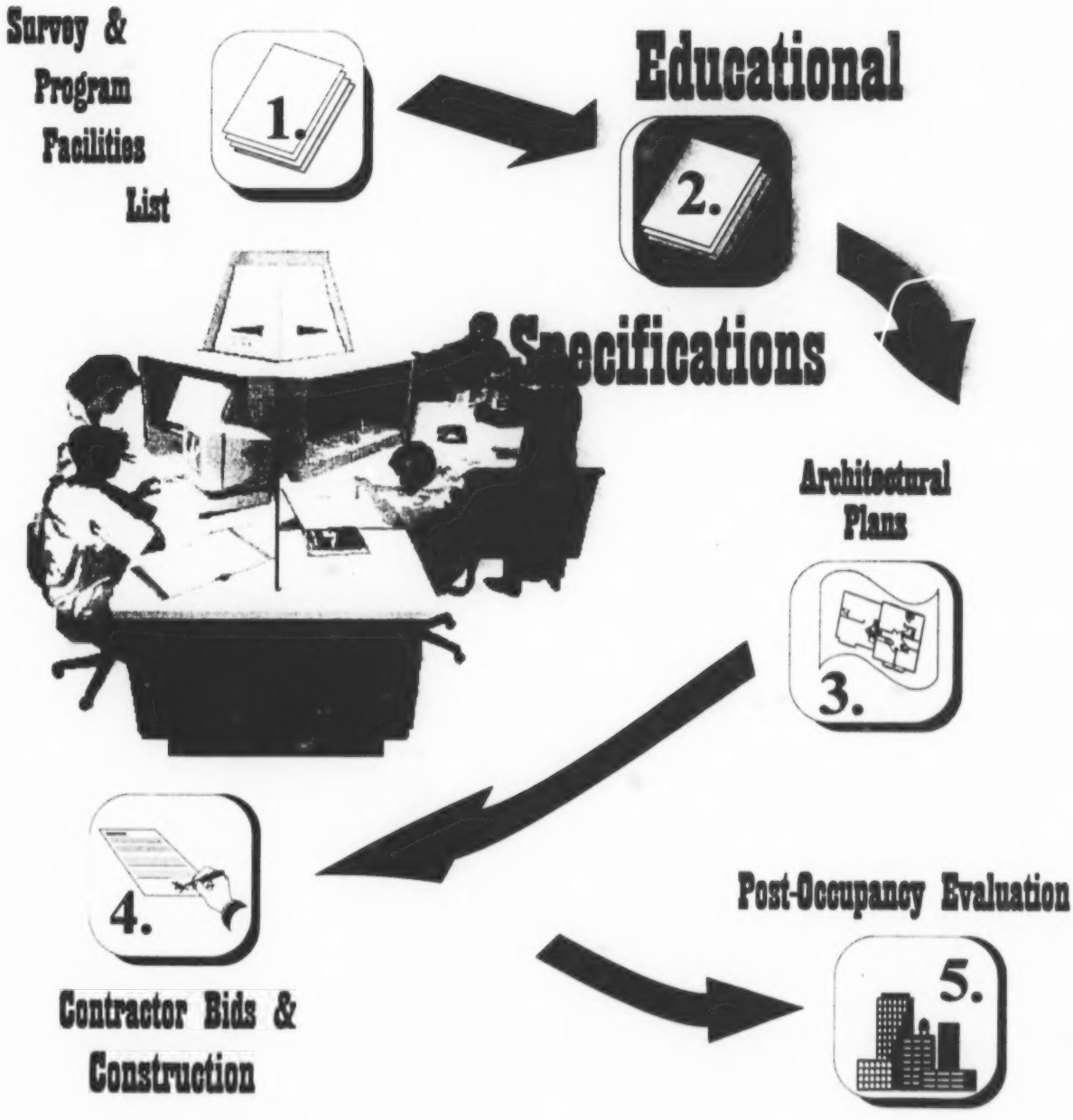
PROCEDURES FOR DEVELOPING A TECHNOLOGY EDUCATION LABORATORY



SECTION 2

EDUCATIONAL SPECIFICATIONS DESIGN DOCUMENT

Information for completing an educational specifications document is derived from the School Board **philosophy of education**, the **school improvement plan**, the school board approved **curriculum**, a program **facilities list**, a comprehensive list of equipment and furniture, and detailed construction guidelines unique to each individual program need.

Educational Specifications may include one program in the Facility List or the complete school depending on the scope of the project. It involves projects which consist of new construction, remodeling and renovation.

Architectural planning and design utilizes this document for several reasons:

1. The educator's point of view on program needs is incorporated into the design.
2. Project approval and guidance is provided according to the School Board philosophy.
3. It provides opportunity for variances on regular procedures or in space requirements.

This document guides the architect through both the project **design phase** and **construction phase**. It also provides a valuable instrument for project evaluation.

TECHNOLOGY EDUCATION FACILITIES DESIGN

The laboratory/classroom design area must accommodate teaching and learning strategies that produce optimum learner outcomes for Technology Education. It is recommended that the classroom be adjacent or near other program areas (mathematics, science, social studies, etc.) for enhancement of the concept of integrating Technology Education with other programs. This collaboration of programs and resources should provide a learning environment to support the interdisciplinary studies concept.

A Technology Education laboratory/ classroom should include:

1. Laboratory/classroom workspace and seating area.
2. Design, research, modular instructional activity area.
3. Production/fabrication dynamic testing/evaluation area.
4. Finishing, photography, material storage, and project area.
5. Resource, small group meeting and teacher planning area.

The arrangement and size of these areas will be dependent upon the educational program, the developmental grade levels, design enrollment, staffing and available space requirements. Individual space requirements for each area are included to facilitate future program planning.

An Educational Specifications document for each project regardless of the scope and sequence is imperative for architectural design. This document should be completed for all new construction and remodeling projects. Remodeling projects must include a current space "**FISH**" (Florida Inventory of School Houses) inventory report and utilize all the available net square feet of available existing space.

A Project Funding proposal should indicate the source and amount of dollar commitment by the School Board, and provide a system of audit control for all combinations of funding sources.

(Sample Format)

EDUCATIONAL SPECIFICATION
LETTER OF TRANSMITTAL

INSTRUCTIONS: Submit one copy of this form with educational, auxiliary, and ancillary with facilities specifications document being transmitted. **FILL IN ALL LINES AND CHECK ALL APPROPRIATE BOXES.**

1. _____ ☐ School District
2. _____ ☐ School Name
3. _____ ☐ School Code Number
4. Description of Project: ☐ New Construction ☐ Remodeling ☐ Renovation

5. ☐ Attached are 2 copies of educational specifications which were **APPROVED BY THE SCHOOL BOARD** on _____, 19 __ for the above referenced facility.

6. District name of project: _____ 7. State survey name of project: _____

8. SURVEY RECOMMENDED: ☐ Yes, Survey Document Date: _____ ☐ No ☐ N/A If not, then funding source does not require a survey recommendations.

9. SURVEY RECOMMENDATION NUMBER(s) or PAGE NUMBER(s): _____ and/or Date of Supplemental Survey: _____

10. Is project on Project Priority List (PPL)? ☐ Yes ☐ No If yes PPL number: _____

11. School Board Approval of the District Facility List - DATE: _____

12. Edition of **Florida Administrative Code** Section SREF that was used in developing the educational specifications - Date: _____

13. FUNDING SOURCE anticipated for this project: (One or more sources may be checked)

☐ CO & DS ☐ PECO ☐ LOCAL MILLAGE ☐ LOCAL BOND ☐ LCIF (Local Capital Improvement Funds) ☐ OTHER (Specify) Please Be Specific

14. District Contact Person: _____ Phone (Commercial) _____ (SunCom) _____

(Sample Format)

FISH DESIGN CODES, ROOM NUMBERS AS FOUND ON FISH, AND EDUCATIONAL SPECIFICATIONS FOR PROPOSED SPACES

1. _____
School District

2. _____
School Name

4. Description of Project: ☐ New Construction ☐ Remodeling ☐ Renovation

GRADE LEVEL: _____

PROGRAM FACILITIES LIST

Fish Code or 6A-2	*Areas or Bldg./ Rms.	Description of Area	No. of Staff Per Area	No. of Students Per Area	No. of Students Total	Net Sq. Ft. Per Unit	Net Sq. Ft. Total
						Subtotal Net Sq. Ft.	
						6% for Mechanical	
						**Total Net Sq. Ft.	
Circulation, Walls, Overhangs, etc.		Up to 32% for grades six through nine Up to 34% for grades nine through twelve					
						***Total Gross Sq. Ft.	

*Note: New construction shall have SREF space reference numbers. A combined Remodeling and Renovation projects should use FISH Building numbers/Room Numbers and design codes. Renovation projects need to submit a Scope of Work Outline and identify the "FISH" spaces.

** Net square feet shall be included for all three types of construction.

*** Net to Gross is required for new construction only.

PROGRAM FURNITURE AND EQUIPMENT REQUEST FORM

Space or Area	No. of Items	DESCRIPTION OF FURNITURE/EQUIPMENT NEEDED	UNIT COST	TOTAL COST
			TOTAL	

Note: Renovation does not include furniture and equipment.

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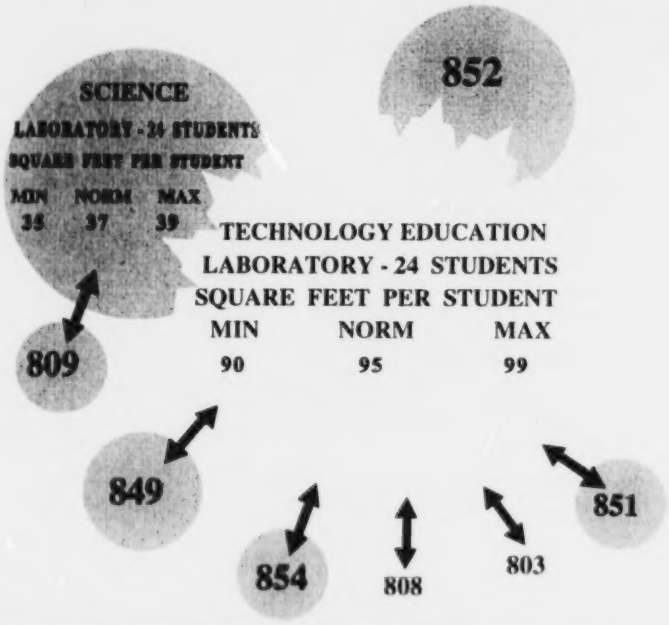
SPACE RELATIONSHIPS

(See elementary school, middle school, or high school models as a reference.)



SPECIAL CONSIDERATIONS

List below any special consideration of HEATING, COOLING, VENTILATION, ACOUSTICAL, FLOOR, WALLS, CEILING, WINDOWS, DOORS, WATER, COMMUNICATIONS, ELECTRICAL, GAS AND AIR, SAFETY, FENCING, SERVICE DRIVES, PARKING that apply to this project.
BUILT-INS:
A. Built-in work counter:
B. Built-in cabinets/shelving:
C. Built-in Instruction Aids:
D. Other Built-ins:
OTHER CONSIDERATIONS: Space configuration, Room Layouts, Site Considerations, etc.

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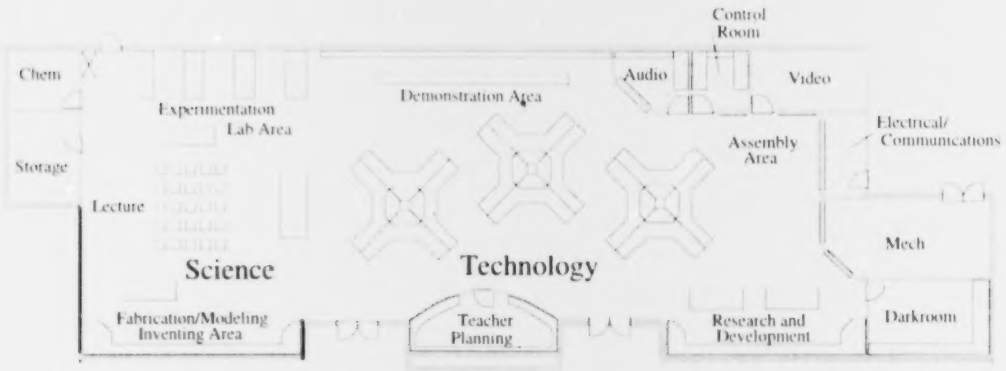
PROPOSED PLANS, FUNDS, AND DESIGN DRAWING
FOR THE REMODELING, RENOVATION, OR NEW CONSTRUCTION OF A SCIENCE AND TECHNOLOGY EDUCATION LABORATORY

* FUNDS REQUESTED:
  NEW CONSTRUCTION: _____
  REMODELING: _____
  RENOVATION: _____
  TOTAL _____

* LABORATORY FLOOR PLAN (sample):



NOTE: Include copies of planning model and floor plan.

INSTRUCTIONS

New Construction should use the "Planned Model" for Technology & Science Laboratory.
Remodeling should closely resemble the "Planned Model" using existing spaces. (FISH attachment must accompany your work).
Remodeling may include renovation and may change the floor plan and/or may change the use of the existing space; renovation only upgrades the existing space.
Renovation need only show the net square feet and scope of work outline.
FISH (**F**lorida **I**nventory of **S**chool **H**ouses)
This document consists of a complete school inventory in terms of its Net Square Feet, Facility, Building and Room Numbers, plus other information (i.e., size, condition, etc.) of importance to school plant planning and maintenance.
CONSTRUCTION COSTS:*

New Construction is 100% X Gross Square Feet.
Remodeling is ½ of New Construction X Net Square Feet.
Renovation is 1/3 of New Construction X Net Square Feet.

*Refer to cost figures for your district on page 31.

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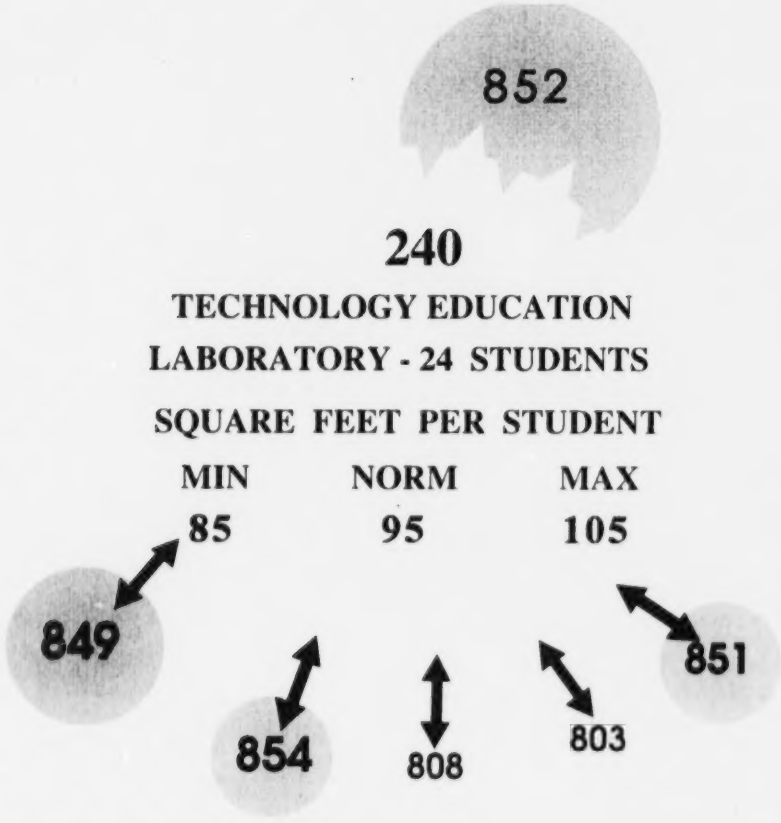
ORIENTATION AND EXPLORATION

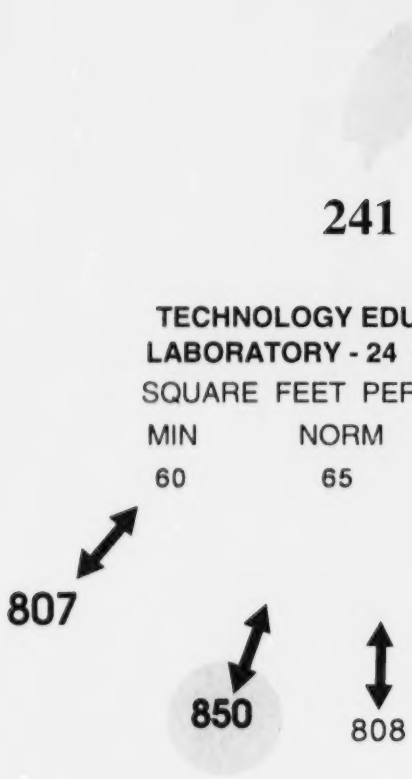


FISH	DESIGN CODE/DESCRIPTION	NET SQUARE FEET		
		Min	Norm	Max
240	Laboratory (NSF x 24 students = total sf)	85	95	105
803	Darkroom	90	100	110
808	Storage, Material Small	70	90	110
849	Storage, Projection Large	240	310	380
851	Storage, Tool Large	250	310	370
852	Resource Center	750	800	850
*854	Darkroom	200	225	250

*Graphic Communications only, may be a variance

TECHNOLOGY EDUCATION LABORATORY

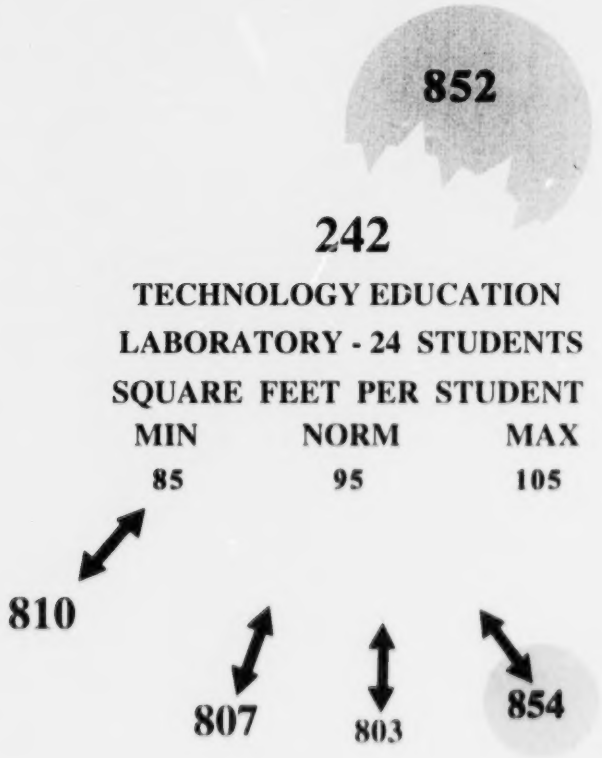
SMALL



FISH	DESIGN CODE/DESCRIPTION	NET SQUARE FEET		
		Min	Norm	Max
241	Laboratory (NSF x 24 students = total sf)	60	65	70
807	Storage, Equipment	300	315	330
808	Storage, Material Small	70	90	110
850	Storage, Tool Small	165	195	225
852	Resource Center	750	800	850

TECHNOLOGY EDUCATION LABORATORY

MEDIUM

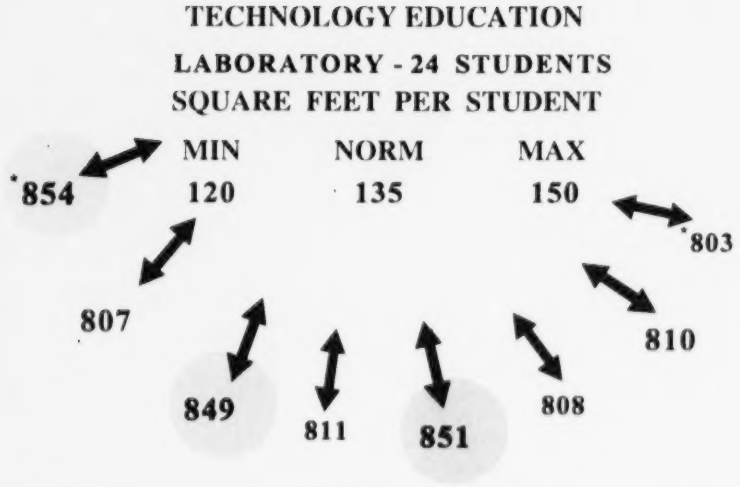


FISH	DESIGN CODE/DESCRIPTION	NET SQUARE FEET		
		Min	Norm	Max
242	Laboratory (NSF x 24 students = total sf)	85	95	105
810	Storage, Material Large	220	395	570
807	Storage, Equipment	300	315	330
803	Darkroom	90	100	110
*854	Darkroom	200	225	250
852	Resource Center	750	800	850

*Graphic Communications only, may be a variance

TECHNOLOGY EDUCATION LABORATORY
LARGE

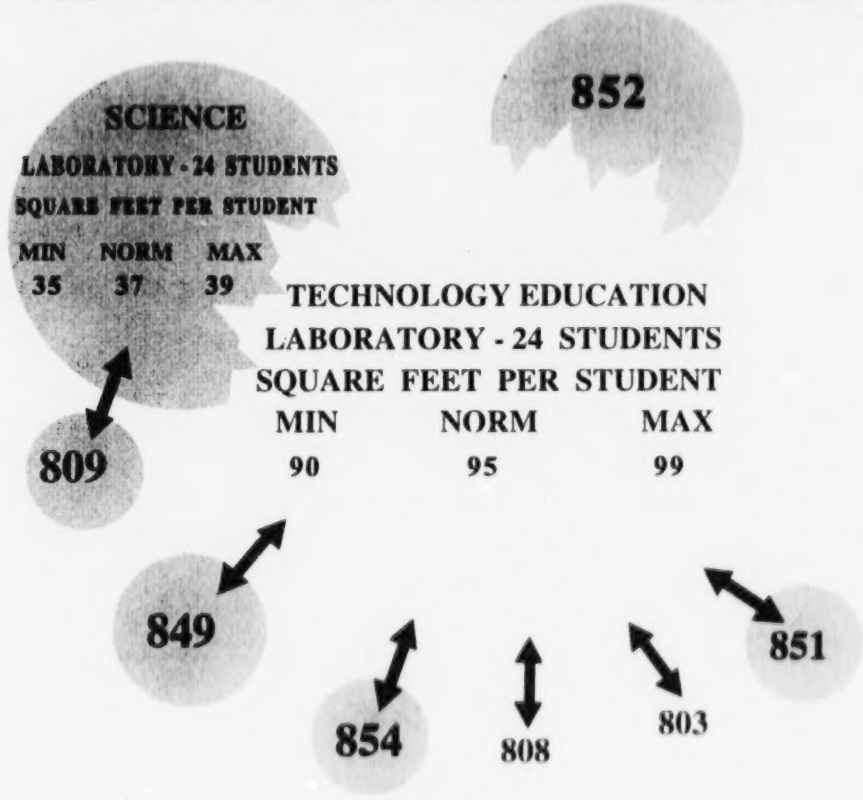
852



FISH	DESIGN CODE/DESCRIPTION	NET SQUARE FEET		
		Min	Norm	Max
243	Laboratory (NSF x 24 students = total sf)	120	135	150
803	Darkroom	90	100	110
807	Storage, Equipment	300	315	330
808	Storage, Material Small	70	90	110
810	Storage, Material Large	220	395	570
811	Storage, Outside	45	50	55
849	Storage, Project Large	240	310	380
851	Storage, Tool, Large	250	310	370
852	Resource Center	750	800	850
*854	Darkroom	200	225	250

*Graphic Communications only, may be a variance

TECHNOLOGY AND SCIENCE LABORATORY



FISH	DESIGN CODE/DESCRIPTION	NET SQUARE FEET		
		Min	Norm	Max
242	Technology Education Laboratory (NSF x 24 students = total sf)	85	95	105
027	Science Laboratory (NSF x 24 students = total sf)	35	37	39
809	Storage, Material	120	150	190
803	Darkroom	90	100	110
808	Storage, Material Small	70	90	110
849	Storage, Projection Large	240	310	380
851	Storage, Tool Large	250	310	370
852	Resource Center	750	800	850
*854	Darkroom	200	225	250

*Graphic Communications only, may be a variance.

"F I S H"
A SAMPLE FACILITIES INVENTORY

AGENCY
FACILITY
CHECK USE | SENIOR HIGH | GRADES HOUSED | 09 12 | CAPITAL OUTLAY CLASSIFICATION | 1 | VALIDATION DATE

CAPITAL OUTLAY FTE FOR 94/95 BY GRADE

PK	01	03	05	07	09	570	11	422	PK-12	TOTAL	1898
KG	02	04	06	08	10	534	12	372		ADULT	

PARCEL	019	OWNER	SCHOOL BOARD	PARKING	DEVELOPED	PLAYGROUND	YES
		ACRES	20	ATHL FIELD	YES	WATER SRC	PUBLIC
		YEAR ACQ	1955	DRAINAGE	INADEQUATE	SEWAGE	PUBLIC
		BLDG PLAN	COMBINATION OF	LANDSCAPE	DEVELOPED	POLICE	COMBINAT
						FIRE RATE	06

BUILDING	12	STRU COMP	CONCRETE	ARTIF LIGHT	UNSHIELDED FLUO	COOLING	NONE
OWNER	SCHOOL BOARD	WALLS	BRICK	LIGHT ADEQ	ADEQUATE	HEAT SOURCE	OIL
PRIME USE	SENIOR HIGH	CORRIDOR	SINGLE OUTSIDE	TELEPHONE	NONE	DISTRIB	CENTRAL
YEAR CONST	1963	STORIES	01	INTERCOM	ONE WAY COMPLET	CAPACITY	ADEQUATE
REL UNITS	0	MECH VENT	YES	EDUCAT TV	NONE		

ROOM	SQ FT		DESIGN	STUDENT STATIONS	FLOOR LOC	FLOOR COVER	YEAR CONST	COND	AGY	PAR	FAC	BLDG
001	316	272	VOCATIONAL LAB SUPPORT SPACE		01	COMPOS	1963	SATIS	342	019	0019	12
001A	80	808	MATERIAL STORAGE (SMALL)		01	CONCRE	1963	SATIS	342	019	0019	12
001B	120	809	MATERIAL STORAGE (MEDIUM)		01	CONCRE	1963	SATIS	342	019	0019	12
002	175	272	VOCATIONAL LAB SUPPORT SPACE		01	COMPOS	1963	SATIS	342	019	0019	12
003	87	808	MATERIAL STORAGE (SMALL)		01	COMPOS	1963	SATIS	342	019	0019	12
004	2,209	242	MEDIUM TECHNOLOGY LAB	23	01	CONCRE	1963	SATIS	342	019	0019	12
005	352	272	VOCATIONAL LAB SUPPORT SPACE		01	COMPOS	1963	SATIS	342	019	0019	12
006	143	315	TEACHER PLANNING OFFICES)		01	COMPOS	1963	SATIS	342	019	0019	12
007	176	818	LOCKERS/RESTROOM/SHOWER		01	TERRAZ	1963	SATIS	342	019	0019	12
008	26	331	CUSTODIAL SERVICE CLOSET		01	CONCRE	1963	SATIS	342	019	0019	12
009	24	822	PUBLIC USE RESTROOM (MALE)		01	TERRAZ	1963	SATIS	342	019	0019	12
009A	23	818	LOCKERS/RESTROOM/SHOWER		01	COMPOS	1963	SATIS	342	019	0019	12

BUILDING	11	STRU COMP	CONCRETE	ARTIF LIGHT	UNSHIELDED FLUO	COOLING	NONE
OWNER	SCHOOL BOARD	WALLS	BRICK	LIGHT ADEQ	ADEQUATE	HEAT SOURCE	OIL
PRIME USE	SENIOR HIGH	CORRIDOR	SINGLE OUTSIDE	TELEPHONE	NONE	DISTRIB	CENTRAL
YEAR CONST	1963	STORIES	01	INTERCOM	ONE WAY COMPLET	CAPACITY	ADEQUATE
REL UNITS	0	MECH VENT	YES	EDUCAT TV	NONE		

ROOM	SQ FT		DESIGN	STUDENT STATIONS	FLOOR LOC	FLOOR COVER	YEAR CONST	COND	AGY	PAR	FAC	BLDG
001	1,094	047	SR HIGH ART	20	01	CONCRE	1963	SATIS	342	019	0019	11
001A	1,008	241	SMALL TECHNOLOGY LAB	7	01	CONCRE	1963	SATIS	342	019	0019	11
001B	124	809	MATERIAL STORAGE (MEDIUM)		01	CONCRE	1963	SATIS	342	019	0019	11
001C	105	315	TEACHER PLANNING OFFICE		01	CONCRE	1963	SATIS	342	019	0019	11
002	396	272	VOCATIONAL LAB SUPPORT SPACE		01	CARPET	1963	SATIS	342	019	0019	11
003	1,570	241	SMALL TECHNOLOGY LAB	20	01	CONCRE	1963	SATIS	342	019	0019	11
004	168	809	MATERIAL STORAGE (MEDIUM)		01	COMPOS	1963	SATIS	342	019	0019	11
005	24	821	STAFF RESTROOM (BOTH SEXES)		01	TERRAZ	1963	SATIS	342	019	0019	11
006	100	808	MATERIAL STORAGE (SMALL)		01	COMPOS	1963	SATIS	342	019	0019	11
007	1,243	244	SMALL INDUSTRIAL LAB	11	01	CONCRE	1963	SATIS	342	019	0019	11
007A	127	317	GENERAL SCHOOL SPACE		01	CONCRE	1963	SATIS	342	019	0019	11
007B	273	810	MATERIAL STORAGE (LARGE)		01	CONCRE	1963	SATIS	342	019	0019	11
008	168	700	INSIDE CIRCULATION		01	COMPOS	1963	SATIS	342	019	0019	11
009	32	821	STAFF RESTROOM (BOTH SEXES)		01	TERRAZ	1963	SATIS	342	019	0019	11
010	196	809	MATERIAL STORAGE (MEDIUM)		01	COMPOS	1963	SATIS	342	019	0019	11

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PROCEDURES FOR DEVELOPING A TECHNOLOGY EDUCATION LABORATORY

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SECTION 3

TECHNOLOGY EDUCATION FACILITIES ARCHITECTURAL PLANS

ARCHITECTURAL PLANNING:

The Florida Legislature, through statutory requirements, influences architectural involvement in facility development and planning for all sixty-seven public school districts. These Laws are enacted to insure uniform safety and sanitation requirements and provide local government entities proper direction relative to issues of public concern. The "State Requirements for Educational Facilities" (SREF) document has changed during the 1994 Legislative Session. Florida's current laws provide for only limited authority over architectural plan development. However, architects' involvement in public school facility planning is carefully monitored and regulated by Federal, State, and local governments and by contract agreement with a local School Board.

Responsible planning of public school facilities emanates from the Educational Specifications that reflect recommendations set forth by professional educators. The Architectural Plans, when approved by the School Board, are negotiated for contract and construction. Upon completion of the project's final design phase, a Certificate of Occupancy is needed before admitting students and staff into the facility.

There are three basic phases of architectural planning: **Schematic Phase**, **Preliminary Design Phase**, and **Final Design Phase**. However, two important preliminary steps are necessary to prepare architectural design plans that meet requirements for final approval by local school officials and the School Board:

Step A. A **Pre-design** and School Board approved document referred to as Educational Specifications, which is outlined in a previous section of this report.

During Pre-design, a School Board appointed architect takes charge of all planning and assumes responsibility for the project design phase and additional building requirements such as design codes, safety/environmental regulations, government standards, constraints imposed by funding and existing conditions. A preliminary meeting with school officials is necessary to identify and clarify all the project requirements and interpret the School Board approved Educational Specifications. Project planning committee members and directors of Facilities and Technology Education should also be present during this time. Project meetings involving remodeling and/or renovation of an existing facility should be conducted at the actual place of construction to help clarify specific details.

Step B. Upon receiving the School Board approved Educational Specifications, the architect also becomes involved in creating physical spaces.

This is the Architectural Design phase of planning with a Schematic design outlining program requirements in greater specificity and instructions for a contractor, revealing in detail the complete planned facility. Each new Design phase builds upon a previous phase and allows input from District administrators, the planning committee and the School Board.

THE SCHEMATIC DESIGN PHASE:

The **Schematic Design** phase consists of site and building preliminary drawings which must meet conceptional design criteria as outlined in the project Educational Specifications. These plans are then evaluated by the planning committee for compliance with all major program goals.

The planning review for Technology Education should give special attention to the overall relationship between this program and other disciplines as well as for continuity among other Technology Education program spaces. However, if the project is remodeling or new construction for only Technology Education, the initial plans should show placement of both furniture and equipment.

Also projects involving remodeling and renovation require close scrutiny of all designated existing spaces plus the careful evaluation of codes, existing mechanical and electrical capabilities, and other underlying physical conditions. Should the Educational Specifications include information on the inventory (FISH) and other spaces to be incorporated into the project, verification of this space information must be completed by the architect.

THE PRELIMINARY DESIGN PHASE:

During the **Preliminary Design** phase, the basic elements of the schematic design are carried forward into the individual room dimensions. This phase includes fixed furnishings and equipment. Location takes on greater depth and sharper focus.

The planning committee members have a greater role during the Preliminary Design phase because this is the last practical opportunity for them to make a substantial contribution to the project. For Technology Education related projects careful attention to detail becomes critical due to the complexity and detail of program needs.

During this Phase, the architect will present existing spaces along with formal evaluations of code, existing mechanical and electrical capabilities and all other underlying conditions.

The Educational Specifications shall contain information about the inventory "FISH" and spaces to be incorporated into this project, but verification of all space information must be completed by the architect.

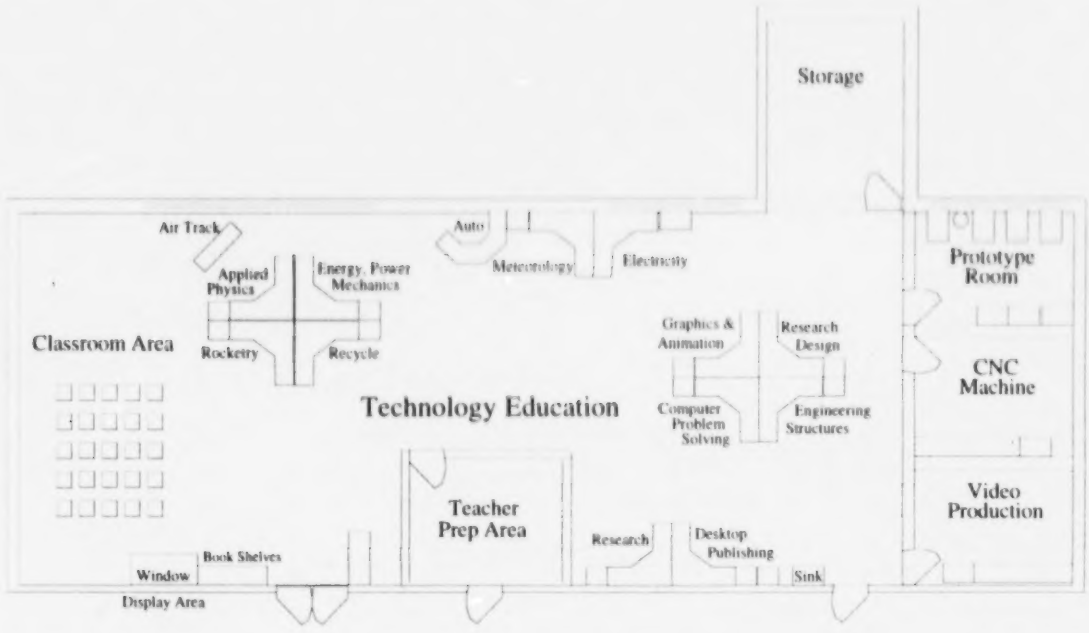
The architect should submit at least one set of Schematic documents to the review committee to allow every option for making intelligent decisions. By this process, **Phase II** and **III** of the **Architectural Plans** are brought into graphic reality and valuable feedback is provided to the architect from the educational community.

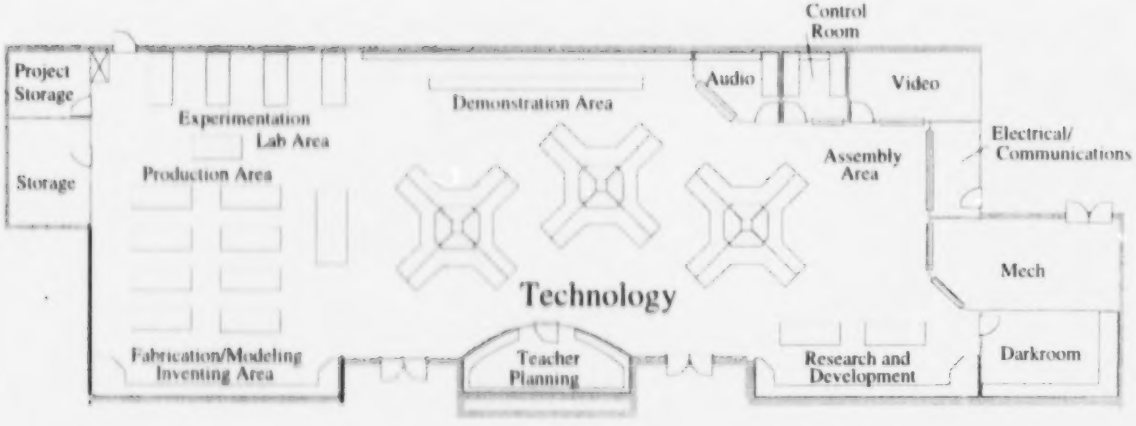
After the planning committee accepts the **Schematic Design** this document is submitted for formal review by local Administration and the School Board.

THE FINAL DESIGN PHASE:

During the **Final Design** Phase, the architect completes detailed documents which will form the contract for construction. These documents consist of construction drawings and written technical specifications. All spaces and systems must be fully described, including demolition, site work, structural work, roofing, doors, windows, finishes, equipment, plumbing, heating and cooling, fire protection, lighting, power, and electronic communications. There must also be a detailed cost estimate and a safety and energy compliance report. The final documents shall accurately reflect the previous planning, the changes by architects, review committee, administration and the School Board. If there are substantial changes in the final design that were not reviewed by the outside planning committee, school officials should proceed toward evaluation and approval. Upon completion, the **Final Design** documents are returned to District administration and School Board for approval, and advertised for bidding by State Certified Contracting Firms. The **Final Design** Phase of planning may also receive Florida Department of Education approval prior to contract at the discretion of the District School Superintendent.

SAMPLES OF TECHNOLOGY EDUCATION SCHOOL LABS





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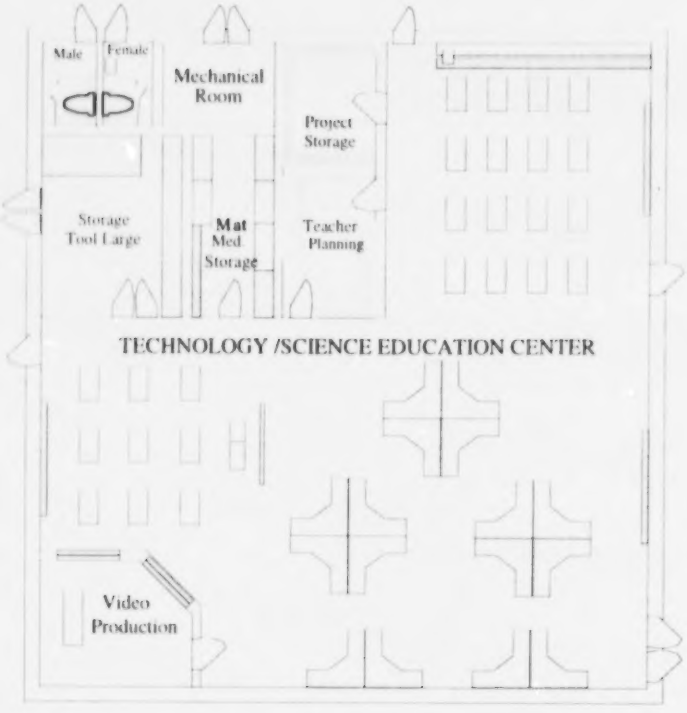

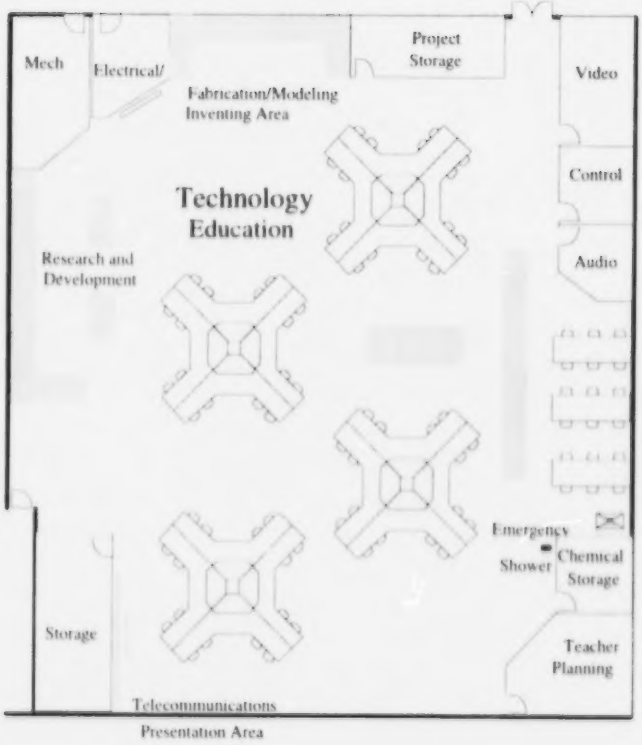

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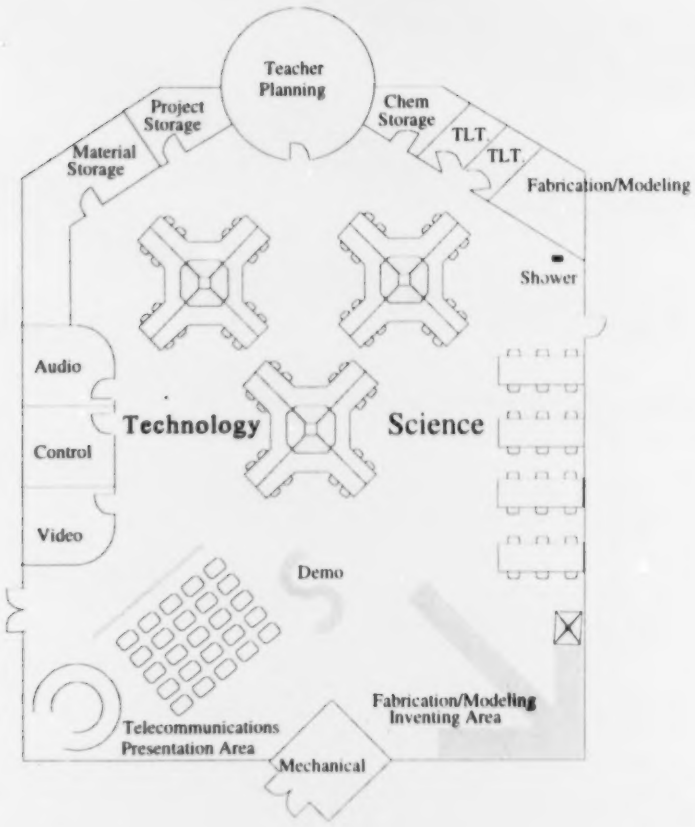

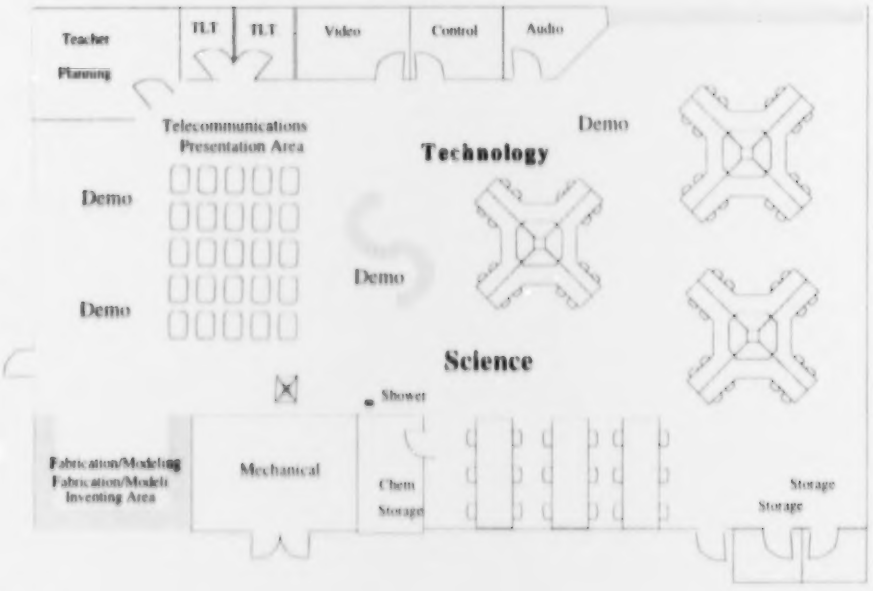

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PROCEDURES FOR DEVELOPING A TECHNOLOGY EDUCATION LABORATORY

SECTION 4

CONTRACTOR BIDS

THE CONTRACT DOCUMENTS: From bidding through construction.

Several important steps are necessary to complete the process of planning for and accepting contractor bids. First is the pre-construction activities; then the construction from the beginning through substantial completion. This is similar for all projects as well as for Technology Education projects including remodeling, renovation or new construction. Educators must be aware of the important aspects of contract agreements and follow all regulations during documentation preparation. It is also important that administrators and architects maintain a realistic dialogue with both contractors and sub-contractors regarding every phase of work.

THE BIDDING PROCESS

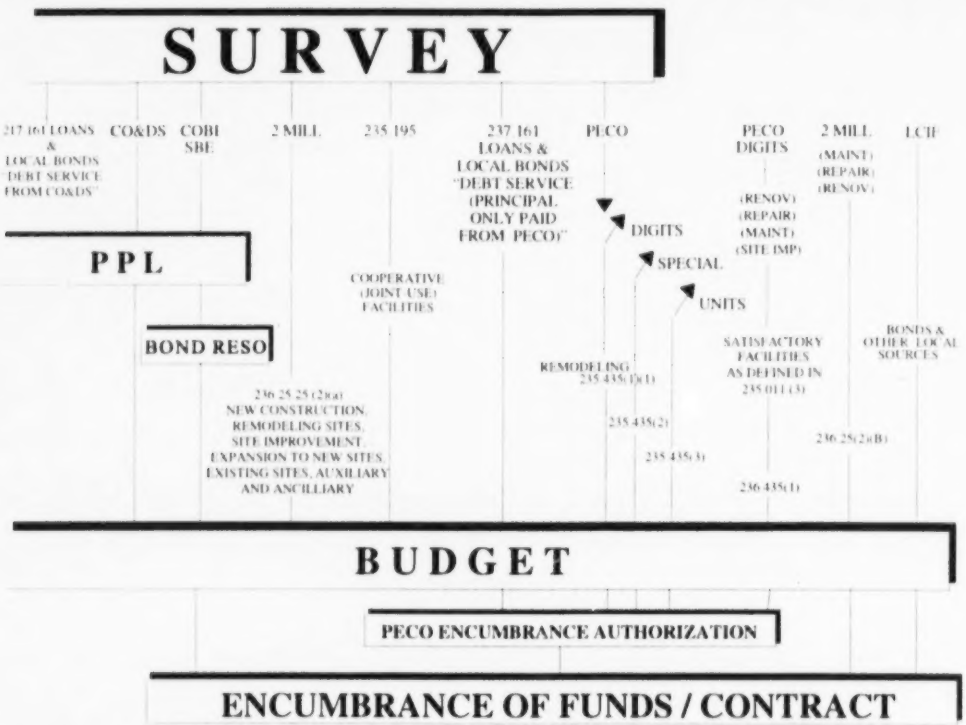
The **Contract Document**, prepared by the Office of Facilities Planning, must contain guidelines for bid preparation and for completing the formal contract agreement. This document is carefully scrutinized by all parties during the pre-bid meeting. Ordinarily, this meeting is held about two weeks after formal advertisement for bids. Attendees at the pre-bid meeting usually consist of contractors, architects, engineers, local administrators, and a local project coordinator. The agenda consists of questions by contractors and sub-contractors regarding the scope of work, the contract and bid proposal requirements, and clarification of all warranties. The final phase plan requirements and cost estimates are also discussed to establish parameters for the contractors bid proposal.

Approximately two weeks after the pre-bid meeting, the formal **Bid Opening** is scheduled to disclose the apparent low bid or alternative bids. This forum of bidders allows everyone the opportunity to personally attend. A final School Board decision may occur either during this meeting, or be delayed two or three days depending upon the contract scope and sequence containments. Bids may be rejected if all favorable conditions are not met. The School Board shall proceed to re-advertise for new bids if a contract was not granted during the Bid-Opening meeting.

However, if the School Board rules favorably, a **Pre-construction** meeting is then scheduled within the following week to discuss all important aspects of the contract. Items discussed are: Who does the work, how the work will be organized, when and where work occurs, the site layout, location of equipment and supplies, identification of all working personnel (i.e., laborers, foreman, suppliers, etc.), the certification of workers, and safety and security provisions during or after working hours. Attending this meeting are school administrators, principals, teachers, the project coordinator, the Technology Education coordinator (if the project is Technology Education), architects and engineers, the contractor and sub-contractors, and district maintenance staff. This may be held at the actual site for additions to existing facilities or for remodeling or renovation projects.

To insure proper supervision of all construction, district representatives should plan periodic meetings to observe what is being done, to review contractor reports, flow sheets of activities, and any changes that require architect or engineer review and approval. Construction **Change Orders** are an important part of any agreement between the contractor and School Board because architectural planning and cost factors are involved. After substantial completion of the proposed facility and a review of the punch list of items is completed, an inspection by a certified building inspector is scheduled. Agreements for disbursement of funds is contained within the contract or is determined by the funding source as in special State or Federal Grant proposals. After a final settlement with the contractor, the facility is then ready for occupancy.

SURVEY - FINANCE RELATIONSHIPS



CAPITAL OUTLAY FUNDING

THERE ARE TWO MAJOR SOURCES OF FUNDING:

(1) State funding sources

[A] PECO (Public Education Capital Outlay)

[B] CO&DS (Capital Outlay and Debt Service)

[C] LOANS

[D] COBI (Capital Outlay Bond Investment Fund)

[E] SBE (State Board Education Bonds)

[F] Lottery

[G] Special Legislative Funds

(2) Local funding sources

[A] 2 Mill (statutory)

[B] LCIF (bonds, gifts, etc.)

[C] Federal Grants

The utilization of funding sources often restricts their use. Therefore, careful planning is required to avoid violations of legal expenditures of these monies. An example is the use of state sources of funding co-mingled with local sources. In this situation, State requirements would prevail unless specific uses for each source of funding could be identified. The chart above will illustrate funding sources and their proper application.

Funding is available for a variety of construction needs. An example would be specific funding for only remodeling projects and new construction, but not renovation. It would be advisable to consult with local district finance personnel or have them contact the Commissioner of Education or the Capital Outlay Office of the Department of Education during the early stages of project planning.

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PROJECT MANUAL AND CONTRACT DOCUMENTS*

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SECTION	TITLE
SECTION A	ADVERTISEMENT TO BID
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SECTION L	INSURANCE CERTIFICATIONS
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SECTION P	LIST OF SUBCONTRACTORS AND SUPPLIERS

DIVISION	TITLE	DIVISION	TITLE
Division 1	General Requirements	Division 9	Finishes
Division 2	Sitework	Division 10	Specialties
Division 3	Concrete	Division 11	Equipment
Division 4	Masonry	Division 12	Furnishings
Division 5	Metals	Division 13	Special Construction
Division 6	Wood and Plastics	Division 14	Conveying Systems
Division 7	Thermal & Moisture Protection	Division 15	Plumbing and Mechanical
Division 8	Doors & Windows	Division 16	Electrical

*The full document has been omitted because each local school district develops its unique set of criteria.

CONSTRUCTION

THE CONSTRUCTION PHASE

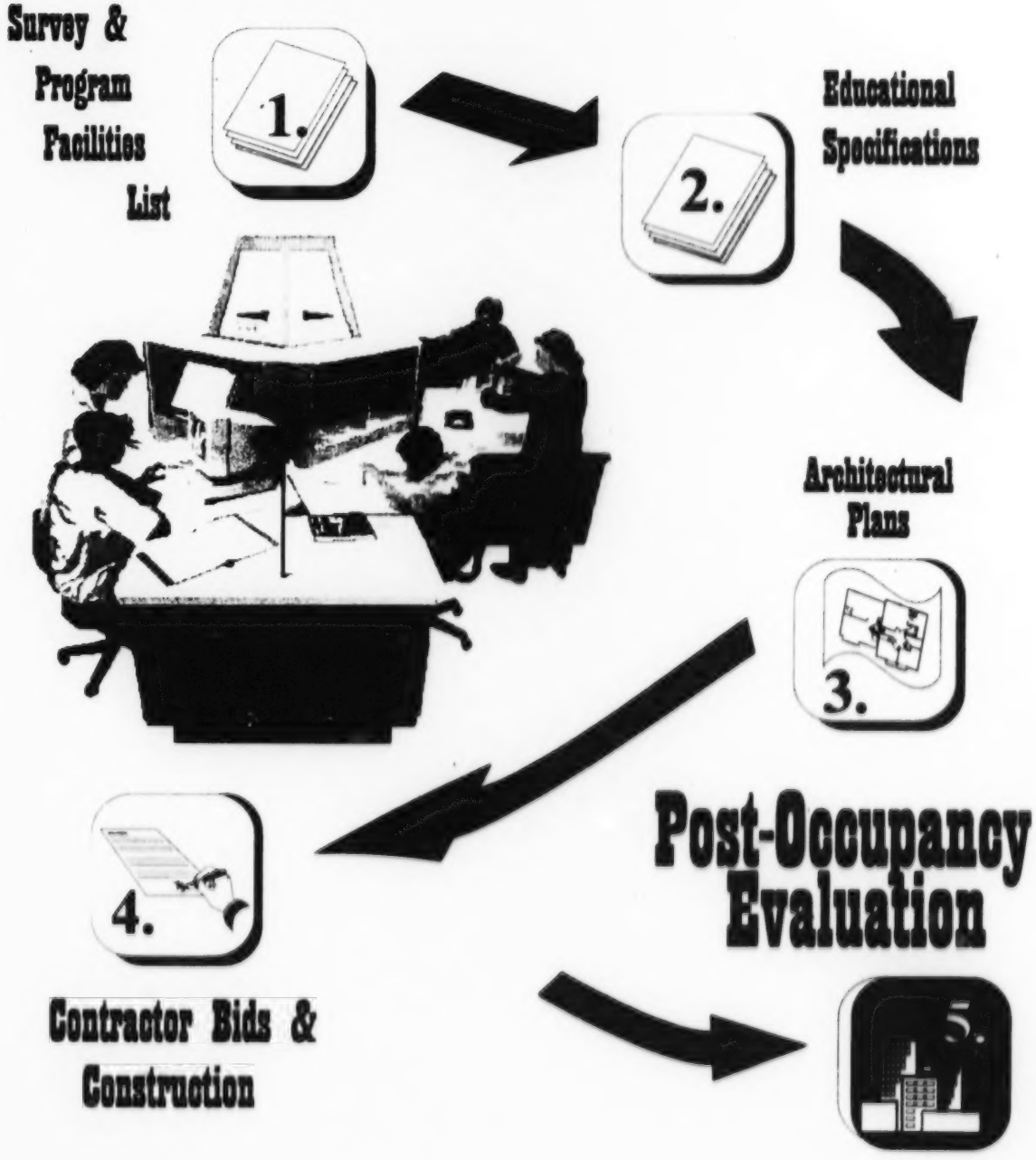
During the construction phase, significant changes are uncommon and the planning committee involvement is very minimal. Changes are usually handled through a "change order" process with extra costs involved. Approval for these costs must come from District administration after consultation with the School Board. Changes that affect Technology Education should be reviewed by a Technology Education supervisor.

Renovation and certain remodeling projects are often completed during school hours. However, coordination is necessary between facilities planners and principal in order to isolate the work area from students and teachers. Any problems encountered by the school administration should be cleared through the facilities planner rather than with a contractor.

THE INSTALLATION OF FURNISHINGS AND EQUIPMENT

The installation of furniture and equipment is the final activity of facility planning and construction. Built in components may be installed under the general contract, but any installation completed by an independent sub-contractor or school personnel requires careful coordination with the project architect who is in charge. Technology Education equipment installation, testing and balancing requires a specialized type of construction, operation, and maintenance. District administration and maintenance staff must obtain warranties and operating manuals for conducting in-service staff training on all new technology components and systems.

PROCEDURES FOR DEVELOPING A TECHNOLOGY EDUCATION LABORATORY



SECTION 5

OCCUPANCY AND POST-OCCUPANCY EVALUATION

After completion and inspection for occupancy, the approved facility is occupied, equipment training begins, and students arrive. Plant maintenance personnel should become familiar with all construction materials and finishes as well as the mechanical, electrical, and electronic systems. The principal should list problems that require correction and notify the Facilities Director prior to the final contractor cost settlement. It is advisable to operate equipment and systems during their warranty period and have the maintenance personnel follow all warranty instructions.

A Post-occupancy evaluation (POE) of the facility provides valuable information regarding the adequacy of performance relative to its design elements. This evaluation from the user, designer and builder shall guide future facility planning. Further information about Post-occupancy evaluation is available from the Florida Department of Education, and is continued in this section.

POST-OCCUPANCY EVALUATION

This evaluation is divided into six parts, each of which focuses on specific objectives:

1. Define post-occupancy evaluation, and examine the reasons why post-occupancy evaluations should be conducted.
2. Identify what should be analyzed as part of the post-occupancy evaluation.
3. Determine when post-occupancy evaluations should be conducted.
4. Determine who should conduct the post-occupancy evaluation.
5. Develop a methodology and format for the post-occupancy evaluation.
6. Provide written documentation outlining the post-occupancy evaluation results.

This outline is useful as an introduction to a post-occupancy evaluation. The primary tasks in the first two steps are designed to answer three important research questions.

What is a post-occupancy evaluation?
Why do a post-occupation evaluation?
What should be analyzed in doing the post-occupancy evaluation?

The remaining four steps are procedural in nature and more related to research documentation.

WHAT IS A POST-OCCUPANCY EVALUATION?

Post-occupancy evaluation (POE) means the evaluation of a building after the Certificate of Occupancy has been issued, or in the case of educational facilities, the evaluation of a facility after the school district has taken possession and moved into the facility.

Evaluations may be conducted at any phase of planning, design, construction, and occupancy of the facility. However, this evaluation focuses exclusively on the completed facility after occupancy, and on the programs upon which the design was based.

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During an evaluation process, information is gathered from users/occupants of the facility. This information is then analyzed to determine how well the facility is currently serving the purpose for which it was originally designed, and what features are successful or not successful. The evaluators then propose changes and improvements in the existing facility and future facilities.

WHEN SHOULD THE POST-OCCUPANCY EVALUATION BE CONDUCTED?

A building evaluation can be done anytime after occupancy, but typically the process of evaluation begins after users have occupied the facility long enough to become familiar with its operation and functions. Normally, the post-occupancy evaluation occurs after the first full year and, if possible, while being used. This evaluation should involve at least two on-site visits and each visit should last two or three days minimum.

WHO SHOULD CONDUCT THE POST-OCCUPANCY EVALUATION?

The post-occupancy evaluation should be conducted by those who were involved in deciding the evaluation objectives and techniques, when to evaluate, and how to fund the evaluation. The foremost decision is who shall conduct the evaluation, the local district personnel or a team from the outside.

Once the decision on staffing has been made, the question of who shall be a part of the survey becomes the most important next step in the process. Most post-occupancy experts agree that the users of the facility should be involved in this evaluation process.

THE METHODOLOGY AND FORMAT FOR A POST-OCCUPANCY EVALUATION

One effective approach is to gather data at varying times after occupancy. These data may originate from several sources:

1. Interviews with students, faculty, and staff.
2. Observation of the new facility in use.
3. Monitoring of environmental conditions including light, temperature, noise, and humidity.
4. Existing facility documents and the project history.

Preliminary Strategies for Gathering Data.

In this phase, the evaluation team begins to collect quantitative data immediately following the final inspection of the facility. This process will document and summarize the project and provide the quantitative information on the facility. This information can be obtained by a review of project files and facility documentation, and through interviews with those most familiar with the project. Key people for this interview process are district staff, project architects, contractors and suppliers.

Also, in this phase, it is important to ensure that personnel and resources are available for the evaluation.

WHAT SHOULD BE ANALYZED IN A POST-OCCUPANCY EVALUATION?

Careful consideration should be used in deciding what will be evaluated in a single project. A comprehensive evaluation is not technically possible; however, three major points should become the focal point of the post-occupancy evaluation.

1. Is the facility **economical** to operate and maintain?
2. Does the facility **function** as intended and does it help or hinder the educational program?
3. Does the facility **perform** adequately and does it provide appropriate shelter?

Educators are primarily concerned about facility economy, function, and performance. These three points are included in the Florida model for a post-occupancy evaluation. They are defined as follows:

The **Economy** (i.e., the utilization of space, time and resources.)

a. The efficient use of space, time, and resources.
b. Ease of maintenance and repair.
c. The use of appropriate materials and technology.
d. The relative quality of materials and construction.
e. The facility's response to the natural and built environment.

The **Function** (i.e., the use of space and its impact on the educational programs and the comfort, safety, and convenience of the users.)

a. Flow, orientation, accessibility and supervision of circulation.
b. The use of space standards for allocation of programmed activities.
c. The intent or actual use of the space for intended program activities and relationships, or non-program activities.
d. Comfort, safety, and convenience.
e. Fixed and movable furniture and equipment.
f. User satisfaction.

The **Performance** (i.e., the adaptable, environmental, and aesthetic quality of the facility.)

a. Imagination and innovation in design and construction.
b. The performance of the structural, mechanical, natural, and electrical building systems.
c. The quality of light, sound, temperature, and humidity controls.
d. Color, texture, space, and perceived aesthetics.
e. The social image and character of the facility.
f. Indicators such as vandalism, theft, etc.
g. Indicators of change and adaptive use of the facility.

COLLECTIVE EVALUATION DATA

The primary data collection procedure consists of two visits followed by data analysis, evaluation and conclusions. Each visit is separate; however, data from the first visit becomes useful for the second visitation team. Pre-visit preparation with district administration is essential for successful data collection and for conducting the Post-Occupancy Evaluation.

Once the evaluation team is chosen, an organizational meeting is conducted to acquaint all members on the procedures to be used and to hand out informational materials on the facility to be visited. This meeting could be held at the facility and may include local administration coordinators.

THE FIRST VISIT:

This occurs after the warranty inspection which is approximately one year after substantial completion of the facility. The data gathering team consists of the coordinator and two team members who visit the facility and collect information through a series of structured questions and conduct several tests on environmental conditions.

A. Structured questionnaires - A sample of personnel involved in the daily use of the facility (faculty, students, administrators, custodians, food service, librarians, etc.) are asked to complete a questionnaire soliciting quantitative and qualitative information about the facility. Their response provides direction for all the subsequent interviews that occur during the second visitation.

B. Site and building questionnaires - They are designed to elicit quantitative information from administrators who were involved in the planning, design, or construction of the facility. The user questionnaire is designed to elicit information from individuals involved in the daily use or who have access to qualitative information about the function and performance of the facility. Quality of performance tests are also conducted relating to economy, function, and performance of the facility.

THE SECOND VISIT:

This occurs approximately one month after the first visit. During this three to four day visit, team members will gather data through group and individual interviews in a conference setting or while walking through the facility, or from observations of the facility during occupancy.

A. Group Interviews - Homogeneous groups of three to six walk through the facility and are asked open-ended questions regarding their feelings on the facility. They may also respond to various questions of importance that were revealed in a previous response. This procedure allows the users to answer questions that were very difficult to answer in the structured questionnaire.

B. Individual Interviews - Personal interviews are conducted with chairpersons of the educational specifications committee, the architect, contractor, chief administrator of the facility, and the maintenance supervisor. These individuals have intimate knowledge of the functioning of the facility and of the design decisions that influence economy, function, and performance.

C. Observations of Facility Use - Team observations are used at various times to review issues from the previous data gathering activity. Standardized forms structure and record this data.

DATA ANALYSIS, EVALUATION RESULTS AND CONCLUSION

In the data analysis, the evaluation coordinator and team members tabulate and analyze the data after each visitation. This analysis occurs in two stages.

FIRST STAGE:

This stage begins immediately after the first visit and concludes prior to the second visitation. Its four components are content analysis, statistical analysis, comparative analysis and investigative analysis.

A. Content Analysis - The evaluators analyze the content of responses to the open-ended questions in each of the structured questionnaires and to their observation of facility use.

B. Statistical Analysis - Frequent counts of percentages are calculated for each of the closed-ended questions in the structured questionnaires.

C. Comparative Analysis - The physical monitoring data and space utilization data are compared with the results from the staff orientation, the structured questionnaires, and the observation of the facility use.

D. Investigative Issues - The results of each of the above listed data analysis techniques are reviewed to identify issues for further investigation during the second visit.

SECOND STAGE:

This stage begins immediately following the second visit. Its five components are content analysis, comparative analysis, physical monitoring, observations of facility use, and collect space utilization reports/class schedules/program changes.

A. Content Analysis - The evaluators analyze the content of the response to each open-ended question of the group interview, the personal interviews, and observations of the facility use.

B. Comparative Analysis - The results from the first evaluation visit are compared with the results from the second evaluation visit.

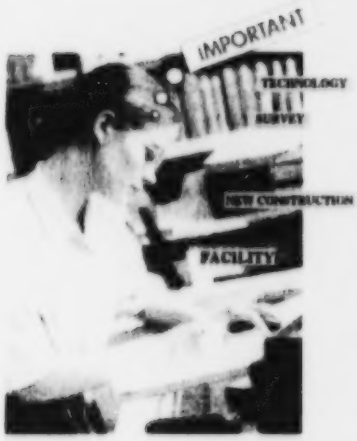
C. Physical Monitoring - Temperature, noise, light, and humidity are recorded as an objective measurement for comparison with results from other data gathering techniques.

D. Observations of Facility Use - The evaluation team observes the facility at various times to identify unusual use patterns and deviations during scheduled activities.

E. Collect Space Utilization Reports/Class Schedules/Program Changes - This documentation needs updating since completion of the Educational Specifications to be a valid reference for comparison with the results of other data gathering techniques. Standardized forms are used during both the group and individual interviews and observations. These forms also provide valuable documentation from individual team members for the final report.

EVALUATION RESULTS AND CONCLUSION

The results of each of the data analysis techniques are reviewed to formulate conclusive statements concerning economy, function, and performance. These statements are compared with the Educational Specifications to formulate a final conclusion about the economy, function, and performance of the facility.



GLOSSARY

Ancillary Plant - is comprised of the building, site and site improvements necessary to provide such facilities as vehicle maintenance, warehouses, maintenance or other administrative buildings necessary to provide support services to an educational program.

Architectural Plans - a project of future construction planned by an architect or engineer who translates an Educational Specification document into drawings and specifications.

Auxiliary Facility - the spaces located at educational plants which are not designed for student occupant stations.

Board - unless otherwise specified, a district school board. The term "Board" does not include the State Board of Education.

Capital Outlay and Debt Service - funds derived from sources authorized by Section 9(d) Article XII of the State Constitution.

Capital Project - for the purpose of S.9(a)(2), Article XII of the State Constitution, as amended, means sums of money appropriated from the Public Education Capital Outlay and Debt Service Trust Fund to the State system of public educational agencies as authorized by the Legislature.

Certificate of Occupancy - a document certifying that the facility is approved for public use. Approval is given by someone who is a certified building inspector.

Change Order - written instructions that differ from the original contract and do not conflict with the Educational Specifications.

Commissioner - the elected official who has limited statutory authority over the Florida Department of Education and has membership in the Florida Cabinet.

Completion Date - the acceptance date, when the School Board approves the work, in whole or in part.

Construction Documents - plans and specifications pertaining to particular construction projects including amendments, addenda, bidding and bid documents, field orders and change orders, all of which are part of the Contract.

Construction Project - the use of plans and specifications by a contractor to assemble materials, develop land, erect a building and/or modify an existing structure.

Department of Education (DOE) - Florida Education Department.

Division of Applied Technology, Adult & Community Education (DATACE) - a division under the Deputy Commissioner for Educational Programs.

Educational Plant - comprises the educational facilities, site and site improvements necessary to accommodate students, faculty, administrators, staff and the activities of the educational program of each plant.

Educational Facilities - the buildings and equipment, and their structures and special educational use areas that are built, installed or established to serve primarily the educational purposes, and secondarily the social and recreational purposes of the community, which may lawfully be used as authorized by the Florida Statutes and approved by Boards.

Educational Plant Survey - every five years the District School Board shall arrange for a study of all existing facilities and make recommendations for new construction, remodeling, renovation of existing facilities and programs, to develop or improve existing sites in order to meet requirements for housing the projected student population, and provide an analysis of expenditures for projected capital outlay projects.

Educational Specifications - the detailed list of programs, based on the Survey, including the space chart criteria and a detailed description of each space for constructing the proposed facility.

Facilities List - descriptive spaces and programs of an educational or ancillary facility that identifies each type of structure to house students and support services. The Facilities List best illustrates a School Board philosophy on the type of learning environment for each student and where students should be housed.

Florida Inventory of School Houses (FISH) - a descriptive list of spaces and other demographic information of each public school agency, site, facility, building and rooms. This information is housed at the Computer Center in Tallahassee, Florida. Information from each Public School District is transmitted to and stored in the Computer Center for use by State Officials and the Public School Administrators and School Boards.

Gross Square Footage - the total of net assigned square footage, plus the non-assigned square footage. (See the Educational Specification document for details.)

Instructional Space - a Survey recommended capacity bearing space used primarily for students.

Maintenance and Repair - the upkeep of educational and ancillary plants, including but not limited to roof or roofing replacement short of complete replacement of membrane or structure; repainting of interior or exterior surfaces; resurfacing of floors; repair or replacement of glass; repair of hardware, furniture, equipment, electrical and plumbing fixtures; and repair or resurfacing of parking lots, roads and walkways. Maintenance and repair shall not include renovation except for the replacement of equipment with new equipment of equal systems meeting current code requirements, providing that replacement item neither places increased demand upon utilities services or structural supports nor adversely affects the function of safety to life systems.

Net Square Footage - interior covered floor areas of a facility measured from wall to wall except for covered walkways and roofed courtyards, which measure roof outlines.

New Construction - any construction of a building or unit of a building in which the entire work is either new or a new addition connected to an existing building.

Post-Occupancy Evaluation (POE) - the evaluation of a building after it has been occupied for a specific period of time, usually a year.

Problem Solving - a formal process for arriving at the "best" solution of a problem with respect to the constraints and specifications outlined in the design brief.

Project Facilities List - all spaces to be constructed by function and area within the recommended budgeted funds and Survey recommendations.

Project - Architect/Engineer- responsible for the translation of specific educational requirements into drawings and specifications.

Project Manual - the document including bidding requirements, sample forms, conditions of the contract, and technical specifications.

Project Priority List (PPL) - a comprehensive list of Survey recommended construction projects approved by the Commissioner of Education.

Public Education Capital Outlay (PECO) - funds derived from State generated taxes for facilities construction.

Remodeling - the changing of existing facilities by rearrangement of spaces and their use. Includes but is not limited to the conversion of two classrooms to a science laboratory or the conversion of a closed plan arrangement to an open plan configuration, or vice versa.

Renovation - the rejuvenating or upgrading of existing facilities by installation or replacement of materials and equipment including but not limited to the interior or exterior reconditioning of facilities and spaces, replacement of air-conditioning heating or ventilating equipment, fire alarm systems, emergency lighting, electrical systems and complete roofing or roof replacement including complete replacement of the membrane structure.

Site - a space of ground being occupied or to be occupied by an educational facility or program housed within a building as part of an educational facility.

Site Development - work that must be performed on an unimproved site in order to make it usable for the desired purpose, or work incidental to any new construction to make the addition usable.

Site Improvement - work that must be performed on an existing site to improve its utilization, correct health and safety deficiencies, meet special program needs or provide additional service areas.

State Requirements for Educational Facilities (SREF) - rules and recommendations for public school facilities design.

Student Capacity - the estimated number of students to be housed at a given time based upon a percentage of utilization for each individual facility or a group of buildings.

Student Stations - the net square footage recommendation for each student by program and grade level.

Substantial Completion - the point in work completion of a project, where the architect declares the owner can occupy or use the facility for its intended purpose.

Supplemental Survey - a survey of additions to a facility, or the remodeling and renovation of existing facility at any time within the five year period should conditions appear to justify a change in the proposed building program as previously outlined in the original five year Educational Plant Survey.

Technical Specifications - a portion of contract documentation consisting of written requirements for materials, labor, equipment, construction systems, standards, and performance of contractual related services.

Technology Literacy - the possession of information on new technology, technology systems, the processes used in technological discovery, the intelligent use of current technological products, and the importance of technology to individuals and to our society.

Technology Design and Problem Solving - the formal process in problem design identification and solution clarification; developing a design brief, exploring alternative solutions, modeling, testing, evaluating and when necessary refining the solution, and final documentation.

Transdisciplinary - learning that involves various subject areas or disciplines.

Uniform Building Code (UBC) - requirements for planning and developing a public education facility.

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Florida Department of Education
Frank Brogan, Commissioner

Product Code TE101

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